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NEWSLETTER 6/2025

TALON PROJECT



TALON

Autonomous and self-organised artificial intelligent
orchestrator for a greener industry 5.0

talon-project.eu

EDITORIAL

This newsletter presents a summary of the primary dissemination outcomes of the project, which include organization of events and technological developments. Specifically, six (6) publications, one (1) organization of a special session, and one (1) blog spot providing insights from the TALON Standardization webinar.

Stylianos Trevlakis, InnoCube

TALON PROJECT SPECIAL SESSION AT ICE CONFERENCE - VALENCIA



Yesterday marked a significant milestone for the TALON project! We successfully hosted our special session "SS04 - Autonomous and Self-organized Artificial Intelligent Orchestrator for a Greener Industry 4.0" at the ICE conference in Valencia.



Our session featured groundbreaking research across six critical areas of Industry 4.0:

- ◆ Adaptive Policy-Driven Network Intelligence - Edge-to-Cloud continuum innovations by Pastellas et al.
- ◆ Network Resilience Enhancement - Automated monitoring and proactive mitigation strategies by Boluda-Prieto et al.
- ◆ VR-Enhanced Manufacturing Training - Immersive simulation technologies by Li et al.
- ◆ Industry 5.0 Safety Solutions - Human-computer collaboration through protective equipment detection by Petropoulos et al.
- ◆ Intelligent Edge-to-Cloud Orchestration - Task allocation and efficiency optimization by Comella et al.
- ◆ Blockchain-Integrated Multi-Agent Systems - Industrial production and logistics optimization by Velastegui Hernández et al.



Impact: These research contributions demonstrate TALON's commitment to developing autonomous AI orchestrators that drive sustainability and efficiency in Industry 4.0 environments.

Thank you to all researchers, participants, and collaborators who made this session a success!

BREAKTHROUGH IN EDGE-TO-CLOUD NETWORK INTELLIGENCE



Excited to share insights from our recent presentation at the **TALON project's** special session (ICE Conference, Valencia)!

📄 Research Highlight: Paper 103

"Adaptive Policy-Driven Network Intelligence for Edge-to-Cloud Continuum"

Authors: Ioannis Pastellas, Sophia Karagiorgou, Mariza Konidi

🔍 Key Innovation:

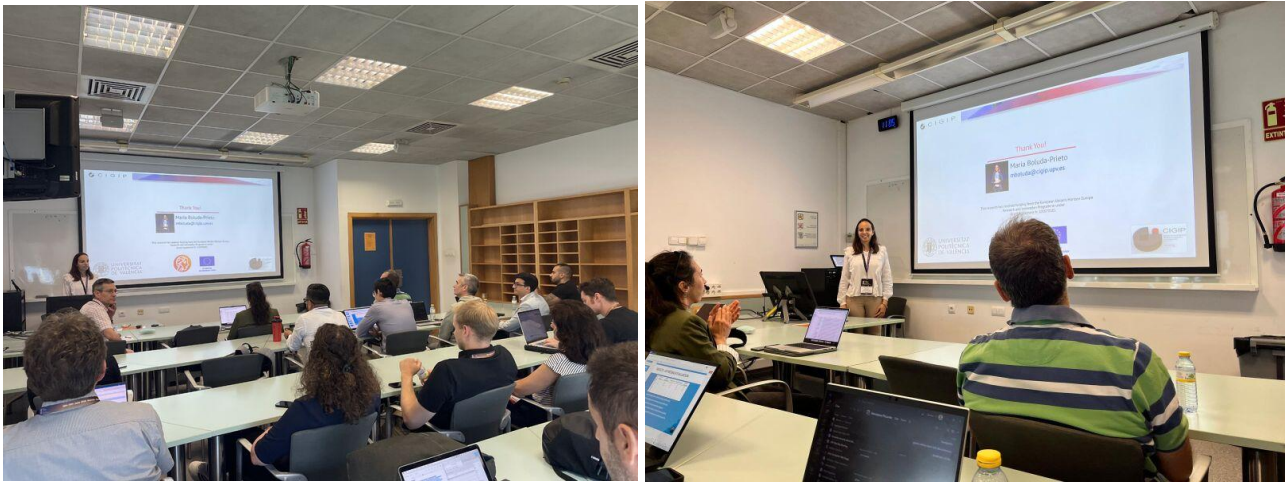
This research introduces adaptive policy-driven approaches that enhance network intelligence across the edge-to-cloud continuum, enabling:

- ◆ Dynamic Resource Allocation - Smart distribution of computational tasks
- ◆ Intelligent Decision Making - Automated policy adaptation based on network conditions
- ◆ Seamless Integration - Bridging edge computing with cloud infrastructure
- ◆ Enhanced Performance - Optimized network operations through adaptive intelligence

🎯 Impact: This work contributes to more efficient, self-organizing network systems that can adapt to changing demands while maintaining optimal performance across distributed computing environments.

Congratulations to the research team for this innovative contribution to the future of network intelligence! 🙌

ADVANCING NETWORK RESILIENCE THROUGH AUTOMATION



Highlighting another excellent research contribution from the TALON special session at ICE Conference Valencia!

Research Spotlight: Paper 105

"Enhancing Network Resilience Through Automated Rule-Based Monitoring, Alerting, and Proactive Mitigation"

Authors: Maria Boluda-Prieto, Francisco Fraile, Faustino Alarcón, Marcos Terol, Miguel A. Mateo-Casali

-  This research presents a comprehensive approach to network resilience through:
- ◆ Automated Monitoring - Real-time network health assessment
 - ◆ Intelligent Alerting - Smart notification systems for critical events
 - ◆ Proactive Mitigation - Preventive measures before issues escalate
 - ◆ Rule-Based Framework - Systematic approach to network protection

 Significance: By implementing automated resilience mechanisms, this work addresses one of the most critical challenges in modern network infrastructure - maintaining continuous, reliable operations in increasingly complex environments.

Applications:

- ◆ Industrial IoT networks
- ◆ Critical infrastructure protection
- ◆ Smart manufacturing systems
- ◆ Distributed computing environments

Excellent work by the research team in advancing network reliability and security! 

PIONEERING SAFETY IN INDUSTRY 5.0 THROUGH AI-POWERED PROTECTION



Showcasing groundbreaking safety research from the **TALON project**'s special session at ICE Conference Valencia!

Research Highlight: Paper 76

"Enhancing Safety in Industry 5.0: Human-Computer Collaboration Benefits through a Dataset of Protective Equipment Detection"

Authors: Alexandros Petropoulos, Georgia Apostolou, Georgios Tsoumplekas, George Tziolas, Nikolaos Ntampakis, Ilias Siniosoglou, Vasileios Argyriou, Panagiotis Sarigiannidis, Ilias Gialampoukidis, Stefanos Vrochidis

-  This comprehensive research advances workplace safety through:
 - ◆ AI-Powered Detection - Automated protective equipment monitoring
 - ◆ Human-Computer Collaboration - Seamless integration of AI and human oversight
 - ◆ Comprehensive Dataset - Rich data foundation for safety applications
 - ◆ Real-Time Monitoring - Continuous safety compliance verification

Industry 5.0 Impact:

Moving beyond automation to human-centric manufacturing, this work ensures:

- ◆ Enhanced Worker Protection - Proactive safety measures

- ◆ Compliance Automation - Reduced human error in safety protocols
- ◆ Collaborative Intelligence - AI supporting human decision-making
- ◆ Scalable Implementation - Adaptable across various industrial settings

💡 Future of Work: This research exemplifies Industry 5.0's vision where AI enhances human capabilities while prioritizing worker wellbeing and safety.

Congratulations to this exceptional international research team! 🌍

REVOLUTIONIZING MANUFACTURING TRAINING WITH VR TECHNOLOGY

Another innovative research presentation from our TALON special session at ICE Conference Valencia!

 Research Feature: Paper 111

"Enhancing Manufacturing Training Through VR Simulations"

Authors: Vladislav Li, Ilias Siniosoglou, Panagiotis Sarigiannidis, Vasileios Argyriou

 This research explores how Virtual Reality transforms manufacturing education and training through:

- ◆ Immersive Learning - Hands-on experience in safe virtual environments
- ◆ Risk-Free Training - Practice complex procedures without real-world consequences
- ◆ Enhanced Retention - Interactive learning improves knowledge absorption
- ◆ Scalable Solutions - Cost-effective training for multiple scenarios

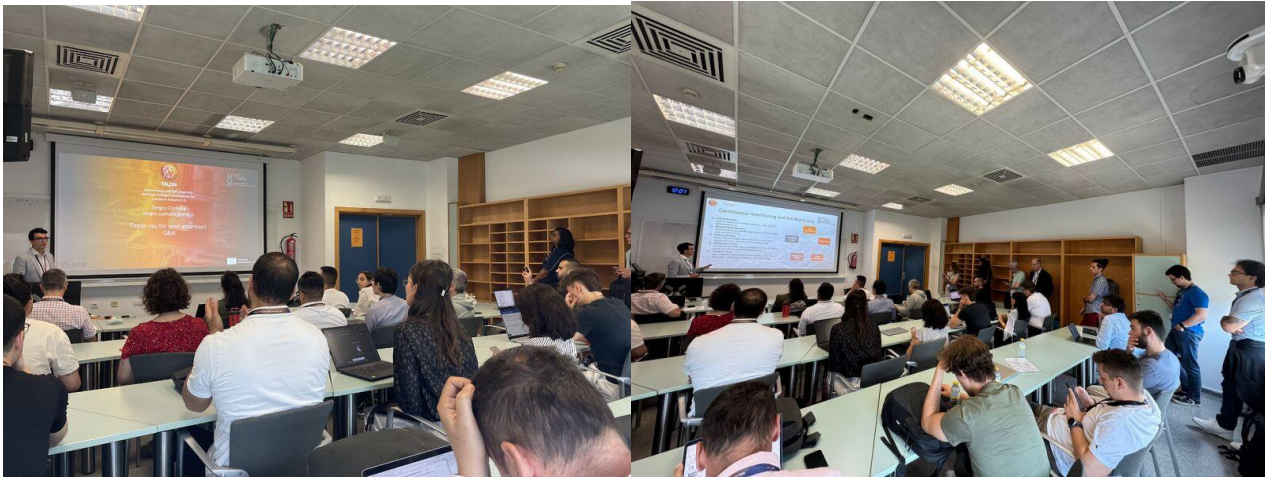
 Key Benefits:

- ◆ Safety First - Train on dangerous procedures safely
- ◆ Cost Reduction - Minimize equipment wear and material waste
- ◆ Standardization - Consistent training experiences across locations
- ◆ Performance Analytics - Track and improve training effectiveness

 Industry Impact: VR training addresses the growing skills gap in manufacturing while reducing onboarding time and improving worker competency in Industry 4.0 environments.

This research paves the way for next-generation workforce development in smart manufacturing! 

NEXT-GENERATION EDGE-TO-CLOUD ORCHESTRATION TECHNOLOGY



Highlighting cutting-edge orchestration research from the **TALON project**'s special session at ICE Conference Valencia!

📄 Research Showcase: Paper 249

"New Edge-to-Cloud Orchestrator for Intelligent Task Allocation and Efficiency Optimisation"

Authors: Sergio Comella, Delia Milazzo, Salvatore Cipolla, Ons Aouedi, Susanna Bonura

🔍 Technical Innovation:

This research introduces a novel orchestrator that revolutionizes distributed computing through:

- ◆ Intelligent Task Allocation - Smart distribution of workloads across edge and cloud
- ◆ Efficiency Optimization - Dynamic resource management for maximum performance
- ◆ Adaptive Scheduling - Real-time decision making based on system conditions
- ◆ Seamless Integration - Unified management across distributed infrastructure

🎯 Key Advantages:

- ◆ Reduced Latency - Optimal placement of computational tasks
- ◆ Energy Efficiency - Minimized power consumption through smart allocation
- ◆ Cost Optimization - Efficient use of cloud and edge resources
- ◆ Scalability - Handles varying workloads dynamically

💡 Industry Applications:

- This orchestrator technology is crucial for:
- Smart manufacturing systems
- IoT deployments at scale

- Real-time industrial applications
- Autonomous system coordination

 Impact: By bridging the gap between edge computing and cloud services, this work enables more responsive, efficient, and cost-effective industrial operations.

Outstanding contribution to the future of distributed computing! 

INTEGRATING BLOCKCHAIN WITH MULTI-AGENT ROBOTICS FOR INDUSTRIAL OPTIMIZATION

Concluding the **TALON project**'s special session highlights with this innovative research from ICE Conference Valencia!

 Research Innovation: Paper 273

"AgentBlock: Infrastructure for integrating blockchain and multi-agent robotic systems for optimising industrial production and logistics"

Authors: Rommel Santiago Velastegui Hernández, Raúl Poler, Manuel Díaz-Madroñero

-  AgentBlock introduces a revolutionary infrastructure combining:
- ◆ Blockchain Technology - Secure, transparent transaction recording
 - ◆ Multi-Agent Systems - Coordinated autonomous robot networks
 - ◆ Industrial Optimization - Enhanced production and logistics efficiency
 - ◆ Decentralized Coordination - Distributed decision-making capabilities

-  Key Innovations:
- ◆ Trust & Transparency - Blockchain ensures secure agent interactions
 - ◆ Autonomous Coordination - Robots collaborate without central control
 - ◆ Production Optimization - Real-time efficiency improvements
 - ◆ Supply Chain Integration - Seamless logistics coordination

-  Applications:
- ◆ Smart Factories - Autonomous production line management
 - ◆ Warehouse Automation - Intelligent inventory and logistics
 - ◆ Quality Assurance - Immutable production records
 - ◆ Supply Chain Tracking - End-to-end transparency

 Future Impact: This research opens new possibilities for trustworthy, autonomous industrial systems where robots can collaborate securely while maintaining complete operational transparency.

 Why It Matters: AgentBlock represents the convergence of three transformative technologies - blockchain, AI agents, and robotics - creating unprecedented opportunities for industrial automation.

Exceptional work by the research team!  



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